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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,587	12/04/2001	Michael A. Tainsky	0788.00063	5172

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EXAMINER	
CLOW, LORI A	

ART UNIT	PAPER NUMBER
1631	

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03/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/004,587	TAINSKY ET AL.	
	Examiner	Art Unit	
	Lori A. Clow	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 26 January 2009 has been entered.

Applicants' response, filed 26 January 2009, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

Claim 20 is currently pending. Claims 1-19 have been cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

I.

Claim 20 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Sioud et al. (European Journal of Immunology (2001) Vol. 31, pages 716-725; previously cited) in view of WO 99/39210 (5 August 1999; Miller et al; previously cited), for the reasons set forth in the previous Office Action and re-iterated below.

The instant claims are drawn to a method of detecting and identifying markers indicative of early stage cancer by differentially biopanning sera from normal and cancer patients against epitope-expressing phage display libraries and obtaining epitope bearing clones present in the early stage of disease based upon antibody reactivity, identifying epitope bearing clones as markers of early stage cancer and including those in a microarray.

Sioud teaches the analysis of the humoral response in patients with cancer. Libraries from breast cancer cell lines were biopanned and positive clones were selected. Using serum antibodies from patients with breast cancer, IgG-binding phage-encoded cDNA products were

selected and the clones identified important antigens including p53, pentraxin and others. The selected phage-displayed cDNA products were recognized by a significant number of breast cancer sera as compared to normal individuals (abstract; Results and Discussion section 2.2 on page 717).

Sioud et al. do not specifically teach a "microarray" of markers within sera. However, Miller et al. teach a high-density protein array for proteome analysis (page 1, lines 5-21). The array may be for high throughput and can be constructed on microtitre wells, membrane support, silicon chips or grids (page 17, lines 1-13).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have utilized the techniques of Sioud to biopan and select clones to array in a large format, as presented by Miller. One would have been motivated to do so because Miller teaches that primary arrays may be developed to emulate antigenic diversity of a cell, tissue, organ, organism from which a biological sample is derived (page 5, lines 16-19). The arrays may be used for comparative purposes to determine whether the protein profile of a "test sample" possess any differences in terms of expressed proteins to a biological reference (page 6, lines 15-16). Miller teaches the use of the arrays to diagnose a human or animal for a medical condition, ailment, illness, or immune response by comparing proteins detected in the biological sample with proteins in a standard, wherein the differences are indicative of the medical condition, ailment, illness, or immune response (page 11, lines 16-30).

II.

Claims 20 remains rejected under 35 U.S.C. 103(a) as being unpatentable over Sioud et al. (European Journal of Immunology (2001) Vol. 31, pages 716-725; recited previously), in view of 2003/0003516 (2 January 2003 with priority to 10 April 2001; Robinson et al.), for the reasons set forth in the previous Office Action and re-iterated below.

The instant claims are drawn to a method of detecting and identifying markers indicative of early stage cancer by differentially biopanning sera from normal and cancer patients against epitope-expressing phage display libraries and obtaining epitope bearing clones present in the disease stage based upon antibody reactivity, identifying epitope bearing clones as markers of early stage cancer and including those in a microarray.

Sioud teaches the analysis of the humoral response in patients with cancer. Libraries from breast cancer cell lines were biopanned and positive clones were selected. Using serum antibodies from patients with breast cancer, IgG-binding phage-encoded cDNA products were selected and the clones identified important antigens including p53, pentraxin and others. The selected phage-displayed cDNA products were recognized by a significant number of breast cancer sera as compared to normal individuals (abstract; Results and Discussion section 2.2 on page 717).

Sioud et al. do not specifically teach a "microarray" of markers within sera. However, Robinson et al. teach an epitope array for determining a specificity profile in a patient (page 2, paragraph 0009). The arrays are high density (page 2, paragraph 0016).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to have used the methods of Sioud with the high-density arrays of Robinson. One

would have been motivated to do so because Robinson teaches the use of arrays or epitopes, for example, to screen for disease (page 6, paragraph 0047).

Response to Applicant's Arguments with regard to Sioud et al. in view of Miller or Robinson

Applicant's Position

Applicant states that "the present invention is a system for the identification of antigens to be included as markers in an array for the immunological diagnosis of early stage cancer. It encompasses three features in a combination not found in the cited art, a combination which possesses improved properties not expected by Sioud et al. or by the combination of Sioud et al. and Miller et al.".

Applicant goes on to state that those three features are as follows:

A. "The invention uses the native humoral immune response to cancer, in all its natural diversity, as the source of antibodies with which to identify antigenic markers for inclusion in a diagnostic antigen assay".

B. "The invention permits the user to identify not only antigenic markers expressed by tumor cells but also those relevant to normal and aberrant regulation of the anti-tumor response. As is well known in the art, the native humoral response to cancer includes not only antibodies to antigens encoded by mutated or overexpressed oncogenes, but also regulatory antibodies, such as antibodies to CD44 and antiidiotypic antibodies...The capability to identify regulatory antigens associated with antibody response arises from the provision of random peptide libraries to screen humoral response, in addition to libraries derived from tumor cDNA ". Applicant states that

claim 20 has been amended to encompass provision of both random and tumor cDNA phage display libraries.

C. "The antigen array identified by the invention is large and divers enough to be used for microarray analysis. This enables the user to diagnose cancer not only by the presence or absence of individual antibodies, but also by differences in the patterns of antibody response characteristic of tumor hosts and normal donors. This higher level of analysis, the comparison of patterns, is made possible by the pattern recognition capabilities of microarray analysis well known in the art".

Applicant's Arguments

1. Applicant argues that "the [method disclosed by Sioud et al] does not permit the identification of antigens other than those expressed by tumor cells, such as regulatory antigens, for it discloses only tumor cDNA expression libraries as candidate antigens".

This is not persuasive. The instant claim does not include limitations to "the identification of antigens other than those expressed by tumor cells". Sioud et al. teach the identification of markers in patients with cancer versus normal individuals. Sioud et al. identify more than one marker from biopanned sera. Sioud et al. identify all epitopes that were identified in cancer versus non-cancer individuals. See page 718, for example, which states:

Positive phage clones are clearly distinguishable from negative clones, confirming the specificity of the immunoreaction. To evaluate the presence or absence of antibodies against the selected phage-encoded cDNA products in normal and cancer patient sera, phage particles from random individual positive clones were purified and tested by an immunospot assay (Fig. 3) as a representative example. The immunoreactivity was quantitated with densitometric imaging using ImageQuant software. Most phages showed a strong reactivity with patient IgG as compared to the reactivity obtained with normal IgG.

2. Applicant argues that "it would not have been obvious to one of ordinary skill in the art to combine Sioud et al. with the high density protein array of Millet et al.". Applicant states that "Miller et al. does utilize microarray analysis, but it does not teach the use of the entire diversity of the native humoral immune response to cancer to identify antigens to be included in an antigen array for the diagnosis of cancer".

This is not persuasive. Sioud et al. is relied upon to teach the analysis of the immune response, both humoral and cellular, in patients with cancer (page 713, column 2). Further, the instant claims are not directed to identifying antigenic markers that are relevant to normal and aberrant regulation of the anti-tumor response. Rather, the claims are directed to biopanning sera from normal and cancer patients. Sioud et al. teaches biopanning from both normal and cancer patient sera in order to make effective comparisons between the two. Miller et al. is relied upon to teach microarray and the ability to array large sets of proteins for comparison purposes.

3. Applicant argues that the methodology of Robinson et al. "teaches away from a system for identifying antigenic markers for inclusion in a diagnostic array".

This is not persuasive. As was previously stated, the claimed method, directed to a microarray, is taught by the combination of Sioud and Robinson. Further, while Sioud teaches the enrichment for the best binders, the teaching does not preclude finding multiple markers, as is instantly claimed. Robinson et al. is relied upon to teach the aspect of arraying multiple epitopes for a specificity profile. Therefore, one of skill in the art could have arrayed multiple epitopes of Sioud et al. in a "high throughput" format as taught by Robinson et al.

Applicant is reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642

F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the instant case, it is either Miller or Robinson that is relied upon to teach the embodiment of "microarray" for the disclosure of a high throughput system.

No claims are allowed.

Inquiries

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR § 1.6(d)). The Central Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lori A. Clow, Ph.D., whose telephone number is (571) 272-0715. The examiner can normally be reached on Monday-Friday from 10 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the

problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

March 5, 2009
/Lori A. Clow/
Primary Examiner, Art Unit 1631